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REMARKS

Claims 1-29 are currently pending in the subject application and are presently under consideration. Claim 29 has been withdrawn from consideration. Claims 30 and 31 have been newly added.

Claims 5, 9, 10, 11, 18 and 23 have been amended herein. Claims 5 and 9 have been amended to more particularly claim the outputs of a plurality of classifiers of the probabilistic dependency model. Claims 10, 18 and 23 have been amended to correct minor typographical errors. Claim 11 has been amended in response to the Examiner's objection to the term "treats" as being indefinite under 35 U.S.C. §112, second paragraph. No new matter has been introduced by these claim amendments.

Claims 30 and 31 have been added. No new matter has been introduced by these newly added claims.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

**I. Objections to Claims 10 and 23**

Claims 10 and 23 have been amended herein in accordance with the Examiner's objection. Withdrawal of this objection is respectfully requested.

**II. Rejection of Claims 5, 9, 11, 16-19, 20, and 22 Under 35 U.S.C. §112, second paragraph**

Claims 5, 9, 11, 16-19, 20, and 22 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully request that the Examiner withdraw the rejection of these claims for at least the following reasons.

The Examiner has indicated that the terms "classic" and "classical" are relative terms that render claims 5, 9, 11, 16-19 and 22 indefinite. MPEP §2173.05 provides, in pertinent part:

The fact that claim language, including terms of degree may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second

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paragraph. *Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.

\* \* \*

When a term of degree is presented in a claim, first a determination is made as to whether the specification provides some standard for measuring that degree. If it does not, a determination is made as to whether one of ordinary skill in the art, in view of the prior art and the status of the art, would be nevertheless reasonably apprised of the scope of the invention.

With regard to the subject invention, the specification provides:

Classical classifier outputs can be yes/no decisions, scores, or other outputs that directly relate to an item's classification. A classifier score is a numerical output that reflects a confidence level or utility associated with a classification decision. The utility of making a classification decision is the benefit of making a correct classification weighted by the probability the classification is correct less the cost of making an incorrect classification weighted by the probability the classification is incorrect. The scores can be used in the probabilistic dependency models of the invention regardless of whether the scores are all defined in the same manner or follow from the same underlying assumptions, such as cost/benefit estimates.

p. 6, line 30 – p. 7, line 7.

Applicants' representative respectfully submits that the terms "classic" and "classical" as recited claims 5, 9, 11, 16-19 and 22 are set forth in the specification of the subject invention and are known to those of ordinary skill in the art.

Next, the Examiner has indicated that the term "treats" is a relative term and render claim 11 indefinite. Claim 11 has been amended to replace the word "treats" with "employs".

The Examiner has further indicated that the terms "potentially" and "useful" are relative terms and render claim 20 indefinite. The specification of the subject application provides:

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A further aspect of the invention is a method of identifying useful reliability indicators. Potentially effective reliability indicators are tested by employing them in probabilistic dependency models to combine or tune classifiers. Effective reliability indicators are identified from improvements in the accuracy and/or efficiency of the combined or tuned classifiers.

p. 3, lines 25-28 (emphasis added).

Reliability indicator searcher 802 compares the performance measures obtained with various potentially effective reliability indicators and provides output 818 identifying the ones that provide significant improvements in performance.

p. 21, lines 28-31.

Claim 20 is directed to a method of identifying useful reliability indicators and recites a limitation of "obtaining potentially useful reliability indicators". Applicants' representative respectfully submits that the phrase "potentially useful" is set forth in the specification of the subject invention and is further known to those of ordinary skill in the art.

Accordingly, withdrawal of this rejection with is respectfully requested.

### III. Rejection of Claim 29 Under 35 U.S.C. §101

Claim 29 stands rejected under 35 U.S.C. §101 because the claimed invention lacks patentable utility. Claim 29 has been withdrawn from consideration. Accordingly, withdrawal of this rejection is respectfully requested.

### IV. Rejection of Claims 1-29 Under 35 U.S.C. §102(e)

Claims 1-29 stand rejected under 35 U.S.C. §102(e) as being anticipated by Gjerdingen *et al.* (US Patent 6,539,395, referred to as Gjerdingen). It is respectfully submitted that this rejection should be withdrawn for at least the following reasons. Gjerdingen, *et al.* does not teach or disclose the present invention as recited in the subject claims.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single

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prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The subject invention generally relates to information management and in particular to a system and method for automatically classifying items. (p. 1, lines 6, 7). The invention provides meta-classifiers and systems and methods for building meta-classifiers. (p. 2, lines 17, 18). Meta-classifiers are combinations of multiple classifiers. (p. 1, lines 23, 24) A meta-classifier provides a determination or indication of whether an item belongs in a particular category. (p. 2, lines 18, 19). The meta-classifiers of the invention apply a probabilistic approach to combining evidence regarding the correct classification of items. (p. 2, lines 19-21). Thus, meta-classifiers of the invention take the form of probabilistic dependency models. (p. 2, lines 21, 22). Using a set of training data and machine learning techniques, the probabilistic dependency models are constructed to effectively utilize evidence that can include the outputs of multiple classifiers. (p. 2, lines 22-24). Additionally, the probabilistic dependency models of the invention can consider additional evidence, such as one or more reliability indicators. (p. 2, lines 25, 26).

To the contrary, Gjerdingen *et al.* discloses "[a] method for creating a database that allows content based searching in the music domain." Abstract. Gjerdingen *et al.* employs feature vectors which are employed to compare music samples. (Col. 3, 18-20). The feature vectors of Gjerdingen *et al.* can include a vocal quality vector, a sound quality vector, a situational quality vector, a genre vector, an ensemble vector and an instrument vector. (Col. 12, line 21 – col. 14, line 35). A modeling module analyzes acquired data and performs a similarity computation. (Col. 15, lines 6, 7). The similarity computation determines the optimum function that can represent similarity between different music samples, based upon defined music attributes (i.e. feature vector values). (Col. 15, lines 6-11).

A function  $F_{ij}$  represents the distances between music sample  $i$  and  $j$  and may be illustrated as:

$$W_g D_g + W_e D_e + W_v D_v + W_t D_t + W_i D_i$$

where  $W_g$ ,  $W_e$ ,  $W_v$ ,  $W_t$  and  $W_i$  are individual weights allocated to individual music spaces.

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(Col. 16, lines 26 – 32). The plural weights Wg, We, Wt and Wi are calculated such that S1 and Fij are at a minimum distance from each other. (Col. 16, lines 32- 34).

Function Fij may be fit using linear regression or by nonlinear regression techniques. (Co. 16, lines 39, 40). Other tools may be used to compute the weights shown and fit function Fij: Bayesian estimation techniques, neural network techniques, classification trees and hierarchical clustering. (Col. 16, line 45 – Col. 17, line 21).

With regard to classification trees, Gjerdingen *et al.* discloses “[c]lassification trees define a hierarchical or recursive partition of a set based on the values of a set of variables.” (Col. 17, lines 40 – 42). “In the present case, the variables are the elements of plural feature vectors.” (Col. 17, lines 42, 43). “A decision tree is a procedure for classifying music into categories according to their feature vector values.” (Col. 17, lines 43 – 45). “Expert pairwise data 403A may be used to define a satisfactory decision tree and then the tree may be applied to a larger set of music.” (Col. 17, lines 45 – 48). “This method partitions music samples into mutually exclusive categories, wherein music samples within each category are considered similar.” (Col. 17, lines 48 – 50).

#### *Independent claims 1 and 24*

Independent claim 1 of the subject invention recites limitations of “a computer system component that applies probabilistic dependency models … wherein the probabilistic dependency models collectively employs outputs from a plurality of classifiers”. Similarly, independent claim 24 recites limitations of “applying probabilistic dependency models … wherein the probabilistic dependency models collectively contain dependencies on outputs from a plurality of classifiers.”

Contrary to the Examiner’s assertion, Gjerdingen *et al.* does not disclose combining the outputs of a plurality of classifiers to form a probabilistic dependency model. Applicants’ representative acknowledges that classifiers based on probabilistic dependency models include classifiers based on decision trees models, support vector machines, Bayesian belief networks, and neural networks (p. 1, lines 14-16).

However, the disclosure of these classifiers in Gjerdingen *et al.* is limited to computation of weights and function fitting. Gjerdingen *et al.* does not teach, disclose or suggest the combination of a plurality of classifiers to form the probabilistic classifier as set

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forth in independent claims 1 and 24.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 1 and 24 (and claims 2, 3, 4, 25 and 26 which depend there from). Accordingly, this rejection should be withdrawn.

*Independent claims 5, 9 and 14*

Independent claim 5 of the subject invention, as amended herein, is directed to a computer system for classifying items and recites a limitation of "a computer system component that applies a probabilistic dependency model to classify an item, wherein the probabilistic dependency model contains dependencies on one or more classical outputs from a plurality of classifiers and dependencies on one or more reliability indicators". (emphasis added).

Similarly, independent claim 9, as amended herein, is directed to computer system and recites a limitation of "a first computer system component that learns, from training examples, probabilistic dependency models for classifying items according to one or more reliability indicators together with classical outputs from a plurality of classifiers".

Independent claim 14 is directed to a computer readable medium having computer executable instructions for performing steps comprising "implementing a plurality of classifiers adapted to receive and classify at least one item, the plurality of classifiers each generating a score related to classification of the at least one item; and for each of one or more categories, facilitating classification, selection, and/or utilization of the at least one item with a probabilistic dependency model that employs one or more of the scores and, in addition, one or more reliability indicators". (emphasis added).

"[R]eliability indicators are, in a broad sense, attributes of the items being classified." (p. 2, line 27). "These attributes can include characteristics of an item, source of an item, and meta-level outputs of classifiers applied to the item." (p. 2, lines 28, 29). "In general, a reliability indicator provides an indication of a classifier's reliability in classifying certain groups of items." (p. 2, line 29 – p. 3, line 1).

As discussed previously, Gjerdingen *et al.* does not disclose combining the outputs of a plurality of classifiers to form a probabilistic dependency model. Furthermore, Gjerdingen

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*et al.* does not disclose employment of reliability indicators with regard to the combination of the plurality of classifiers.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 5, 9 and 14 (and claims 6, 7, 8, 10, 11, 12, 13 and 15 which depend there from). Accordingly, this rejection should be withdrawn.

*Independent claim 16*

Independent claim 16 of the subject invention is directed to a system for classifying items and recites a limitation of "means for determining a model that classifies the items based on a probabilistic approach that combines information about the items including one or more classical outputs of classifiers and one or more attributes of the items other than classical outputs of classifiers". (emphasis added).

As discussed previously, Gjerdingen *et al.* does not disclose combining the outputs of a plurality of classifiers to form a model. Furthermore, Gjerdingen *et al.* does not disclose employment of attributes with regard to the combination of the plurality of classifiers.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 16. Accordingly, this rejection should be withdrawn.

*Independent claim 17*

Independent claim 17 of the subject invention is directed to a computer-readable medium having stored thereon a data structure useful in classifying items and recites:

first data fields containing data representing an attribute to test, wherein the attributes represented include both classical classifier outputs and reliability indicators;

second data fields corresponding to the first data fields and containing data representing values against which to compare the attributes;

third data fields containing data representing classifier outcomes;

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fourth data fields facilitating determination of relationships among instances of the first, second, and third data fields, the relationships having a decision tree structure with the first and second data fields corresponding to decision nodes and the third data fields corresponding to leaf nodes.

As discussed previously, Gjerdingen *et al.* does not disclose combination classifier outputs and reliability indicators to classify items.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 17 (and claim 18 which depends there from). Accordingly, this rejection should be withdrawn.

#### *Independent claim 19*

Independent claim 19 is directed to a method of generating a classifier and recites a limitation of “applying a probabilistic approach that uses the training examples to develop a model that combines evidence to provide an output relating to whether an item belongs in a category ... wherein the evidence comprises one or more classical outputs of other classifiers and one or more attributes of the item other than the classical outputs of classifiers”.

(emphasis added). As discussed previously, Gjerdingen *et al.* does not disclose the combination of classifier outputs and attributes to classify items.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claim 19 (and claims 20, 21, 22 and 23 which depend there from). Accordingly, this rejection should be withdrawn.

#### *Independent claim 24*

Independent claim 24 is directed to a method of classifying items and recites limitations of “applying probabilistic dependency models, one for each of a plurality of categories, to an item stored in computer readable format to provide an output relating to whether the item belongs in the category with respect to each of the plurality of categories; wherein the probabilistic dependency models collectively contain dependencies on outputs from a plurality of classifiers.” Gjerdingen *et al.* does not disclose the combination of

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classifier outputs to classify items.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claim 24 (and claims 25 and 26 which depend there from). Accordingly, this rejection should be withdrawn.

*Independent claim 27*

Independent claim 27 is directed to a method of combining a plurality of classifiers to classify items and recites a limitation of "sequentially applying tests to the items to obtain test results". As discussed previously, Gjerdingen *et al.* does not disclose the combination of classifier outputs to classify items.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 27 (and claim 28 which depends there from). Accordingly, this rejection should be withdrawn.

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**CONCLUSION**

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 (Ref. No. MSFTP217US).

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,

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